

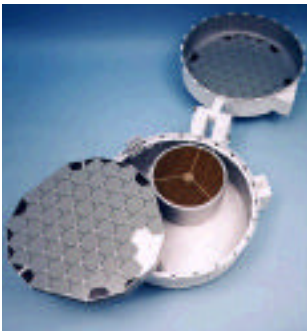
Genesis arrives at KSC

Spacecraft that will capture solar wind will launch July 30

By Martha Heil

Right: Workers off-load the Genesis spacecraft as it arrived at Kennedy Space Center's Shuttle Landing Facility at 3:30 a.m. Eastern time on May 31.

Below: The Genesis science canister. Inside the lid and on a rotating arm are arrays of hexagonal wafers into which solar wind particles will embed.



t h e S O L A R S Y S T E M



JPL's GENESIS SPACECRAFT, to be launched aboard a Boeing Delta II vehicle on July 30, arrived May 31 at Florida's Kennedy Space Center from Denver aboard a U.S. Air Force C-17 aircraft.

Genesis will capture a piece of the Sun—a sample of the ions and elements in the solar wind—and bring the samples back to Earth so that scientists can study the exact composition of the Sun and probe the solar system's origin. By studying the solar wind, scientists will find clues to the formation of the solar system as we know it today. JPL manages the Genesis mission for NASA and the spacecraft was built by Lockheed Martin Astronautics, Denver.

In 2004, Genesis' samples will return to Earth in a spectacular helicopter capture. As the sample return capsule parachutes to the ground in Utah's Air Force Test and Training Range, specially trained helicopter pilots will catch it. The samples will then be analyzed to provide a "Rosetta Stone" of solar material for comparing the Sun's original ingredients to those of the planets and other solar system bodies. Information on the mission is available online at <http://genesismission.jpl.nasa.gov>.

The spacecraft will be processed for launch in Kennedy Space Center's Payload Hazardous Servicing Facility. Processing will begin with a functional test, an electrical systems test of the

spacecraft and deployment of the solar arrays. A test on June 7 will verify the spacecraft's communications systems and radio links to NASA's Deep Space Network space telecommunications system. Science instrument operations tests are scheduled June 11, and on June 12 the solar arrays will be cleaned and stowed for launch.

Genesis will be mated to a Star 37 upper stage booster on July 17 before being transported to Space Launch Complex 17 the following day. Once mated to the Delta II, a spacecraft functional test will be performed. The payload fairing is to be installed around Genesis on July 25. Stacking of the Boeing Delta 7326 launch vehicle at Pad 17-A is scheduled to begin on June 12. Launch is scheduled for July 30 at 9:36 a.m. Pacific time.

Genesis is part of NASA's Discovery Program of competitively selected, low-cost solar system exploration missions with highly focused science goals. Chester Sasaki of JPL is project manager, and Dr. Donald Burnett of Caltech is the principal investigator.

Deep Impact approved for development

By Martha Heil

JPL's Deep Impact mission, the first mission to ever attempt to impact a comet nucleus in order to answer basic questions about the nature of comets, has successfully completed its preliminary design phase and has been approved by NASA to begin full-scale development for a launch in January 2004.

"The Deep Impact mission follows the great tradition of other Discovery missions like Mars Pathfinder and the Near Earth Asteroid Rendezvous," said JPL's Brian Muirhead, the Deep Impact project manager. "The project team at JPL, Ball Aerospace and the University of Maryland are very excited and fully prepared to implement this technically challenging and scientifically unique mission."

The Deep Impact team of scientists, engineers and mission designers, from JPL, the University of Maryland, and Ball Aerospace and Technologies Corp., have been working for more than 18 months designing the mission, the dual spacecraft and three science instruments. The encounter with Comet Tempel 1 on July 4, 2005 will reveal clues to the origin of comets and the composition and structure of perhaps the most mysterious objects in our solar system.

Now the Deep Impact team is completing the final design details and will begin building the mission's two spacecraft: a flyby spacecraft and a 771-pound (350-kilogram) impactor spacecraft. They will be launched together in early 2004 and travel to Comet Tempel 1's orbit, where they will separate and operate independently. The flyby spacecraft will release the impactor into the comet's path, then watch from a safe distance as the impactor guides itself to collide with the comet, making a football field-sized crater in the comet's nucleus.

"This is a major milestone for us," said Michael A'Hearn of the University of Maryland, the principal investigator and mission director. "We have now shown NASA that we have a viable design for the spacecraft and the mission to carry out a truly rare, large-scale experiment on another body of the solar system."

As the gases and ice inside the comet are exposed and expelled outward by the impact, the flyby spacecraft will take pictures and measure the composition of the outflowing gas. The images and data will be transmitted to Earth as quickly as possible. Many observatories on Earth should be able to see the comet dramatically brighten just after the impact.

Scientists refer to comets as time capsules that hold clues about the formation and evolution of the solar system. Comets are composed of ice and dust, the primitive debris from the solar system's earliest and coldest formation period, 4.5 billion years ago. They would also like to learn much more about a comet's composition, structure and how its interior is different from its surface.

Discovered in 1867, Comet Tempel 1 orbits the sun every 5.5 years. It has made many passages through the inner solar system, making it a good target to study evolutionary change in the mantle, or outer crust, of a comet.

Artificial intelligence will command mission next year

By Carolina Martinez

t h e T E C H N O L O G Y

JPL software that thinks for itself and makes decisions without help from ground controllers will fly as the brains of triplet satellites in 2002. The software builds on previous efforts to use artificial intelligence to control a spacecraft (such as JPL's Remote Agent experiment, which controlled the Deep Space 1 spacecraft during portions of several days in 1999). However, this new software uses more advanced technology to respond more quickly to events and will command a mission continuously for a period of approximately three months.

The Continuous Activity Scheduling, Planning Execution and Replanning (CASPER) software will guide a constellation of three identical miniature satellites, each weighing less than 15 kilograms (33 pounds). The three satellites will be launched from the space shuttle in a stack configuration and fly in formation as part of the Three Corner Sat mission, a joint project of Arizona State University, the University of Colorado, New Mexico State University, the Air Force Office of Scientific Research and NASA.

The mission goal is to demonstrate stereo imaging, formation flying, and innovative operations and commanding.

"The onboard software performs the decision-

making function for the spacecraft," said Dr. Steve Chien, principal scientist and lead researcher in automated planning and scheduling technologies at JPL. "Like a brain that uses inputs from the eyes and ears to make decisions, this software uses data from spacecraft sensors, such as cameras, to make decisions on how to carry out the mission.

"Low-quality science images or short-lived phenomenon could be discarded to free up space for newer science images," Chien said. "The onboard sensors and software might detect a volcanic eruption or solar flare might trigger science imaging."

The decision-making capability of the software is being considered for a wide range of NASA applications, including automated ground communications stations, planetary rovers and robot aircraft. Software with similar capabilities has been used by commercial companies for managing the distribution networks for groceries and other retail goods and for controlling the production of computers, automobiles, semiconductor chips, and consumer goods

For more information, log on to <http://casper.jpl.nasa.gov>.

News Briefs



A student from the Colorado School for the Deaf and Blind examines images from “Touch the Universe,” a book that includes images from the Hubble Space Telescope.

Book helps the blind to touch the stars
Students who are visually impaired now have a unique opportunity to touch the stars and experience some of NASA's spectacular discoveries.
Majestic space images from the Hubble Space Telescope, including those taken by the JPL-developed and built Wide Field and Planetary Camera 2, are part of a new Braille book that combines tactile illustrations with striking images of planets, star clusters and nebulae.
The book, “Touch the Universe: A NASA Braille Book of Astronomy,” is the brainchild of Bernhard Beck-Winchatz, an astronomer and faculty member at DePaul University, Chicago.
Teaming up with astronomer and author Noreen Grice of Boston, Beck-Winchatz developed the book with a \$10,000 Hubble Space Telescope grant for education programs. In 1999, Grice published “Touch The Stars,” a book with touchable pictures based on drawings of constellations, comets, galaxies and other astronomical objects.
To allow both blind and sighted readers to enjoy the Hubble images in “Touch the Universe,” Grice developed clear tactile overlays for each image. The overlays were sent to Benning Wentworth, a science teacher and astronomy enthusiast at the Colorado School for the Deaf and the Blind in Colorado Springs. His students evaluated each image for clarity and provided important suggestions for needed changes.
The book is for middle- and high-school students and adults alike, with and without sight. The book will sell for slightly above production cost so earnings can offset future updates and production of a second edition. The project received grants for education from NASA's Office of Space Science.
Photos of students from the Colorado School for the Deaf and Blind examining images from “Touch the Universe” are available at <http://analyze.depaul.edu/ttu>.

Lab contractor wins quality award
JPL contractor Raytheon ISSS has received the 2001 George M. Low Award, NASA's premier quality and productivity award for the aerospace industry. This annual award program recognizes NASA large and small businesses that demonstrate an exceptional level of quality and technical performance in NASA-related contracts

or subcontracts.
Raytheon ISSS, which was also nominated by NASA's Goddard Space Flight Center and the Ames Research Center, received the award in the large business-service category. In the past three years, the company has signed contract work orders with JPL worth \$40 million.
Another JPL-nominated contractor, Composite Optics Inc., received a finalist plaque in the small business-service category. In the past three years, the company has completed more than 70 contract work orders.
JPL contract technical managers provide nominations for the Low Award. Among the factors considered for the award are customer satisfaction and contract technical performance; schedule and cost performance; leadership and continuous improvement; and innovative management and/or technology breakthroughs.
The awards were presented last month at NASA's Continual Improvement and Reinvention Conference on Quality Management in Virginia.

Art competition winners selected
Winning entries for the 2001 Director's Art Competition are now on display on the ninth floor of Building 180.
The selected artwork has also been posted on the Director's home page at <http://ood>. Under “Information of General Interest,” select “Director's Art Competition 2001.”

Wine-tasting benefit set for June 23
The Child Educational Center's annual wine-tasting benefit will be held June 23 from 6:30 to 11 p.m. at Caltech's Avery House.
All proceeds from the evening will benefit the nonprofit CEC, which has been providing child care and educational outreach services to the JPL and Caltech communities—and to the general public—since 1979.
Wines, food, auction items, gaming and live music by the Chad Edwards Quartet will be featured. Tickets are available at the ERC and the CEC office, 140 Foothill Blvd., La Cañada (adjacent to La Cañada High School), at \$30; 10 tastes of premium wines will be served at a special Connoisseur table, for which tickets are \$60.
For more information, call the CEC at ext. 4-3418.

Special Events Calendar

Ongoing Support Groups	For an appointment, call (877) 209-3140, ext. 2614.
Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.	
Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.	
End of Life Issues and Bereavement—Meets the second Monday of the month at noon. For location, call the Employee Assistance Program at ext. 4-3680.	
Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays of the month at noon in Building 125-133. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.	
Parent Support Group—Meets the third Thursday of the month at noon. For location, call the Employee Assistance Program at ext. 4-3680.	
Senior Caregivers Support Group—Meets the first Tuesday of the month. For time and location, call the Employee Assistance Program at ext. 4-3680.	
Friday, June 8– Sunday, June 10	
<i>Six Characters in Search of an Author</i> —Theater Arts at Caltech will present its final performances of the Pirandello play in Ramo Auditorium at 8 p.m. on Friday and Saturday, 2 p.m. on Sunday. Tickets are \$15. Call (626) 395-4652.	
Saturday, June 9	
Theater Auditions—JPL employees, retirees and family members are invited to audition at 1:30 p.m. in Caltech's Ramo Auditorium for the Theater Arts at Caltech production of <i>The Notebook of Trigorin</i> by Tennessee Williams. The play will be performed during fall term on three consecutive weekends beginning Nov. 3. Log on to www.its.caltech.edu/~tacit for related information.	
Sunday, June 10	
Skeptics Society Lecture—Dr. Michael Shermer will present “The Borderlands of Science: Where Sense Meets Nonsense” at 2 p.m. in Caltech's Baxter Lecture Hall. Donations: \$5 for members, \$8 for nonmembers.	
Monday, June 11	
American Heritage Week—The annual festivities, featuring a variety of music, dancing, guest speakers and international foods, get underway today and continue through Thursday, June 14.	
Tuesday, June 12	
JPL Stamp Club—Meeting at noon in Building 183-328.	
Tues., June 12–Wed., June 13	
Investment Advice—TIAA/CREF will hold one-on-one counseling sessions.	
Wednesday, June 13	
Fidelity Investment Review—Roland Jacobson, Fidelity vice president of investment consulting, will present economic and current market overviews, and discuss historical Fidelity mutual fund performance, from 2 to 4 p.m. in von Kármán Auditorium.	
JPL Amateur Radio Club—Meeting at noon in Building 238-543.	
JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Jim Raney at ext. 4-6301.	
Thursday, June 14	
TIAA/CREF Enrollment—This monthly meeting, held at noon in T1720-137, will assist employees who are newly eligible for Caltech/JPL retirement plan participation in selecting investment options and completing enrollment forms.	
Tuesday, June 19	
JPL Hiking+ Club—Meeting at noon in Building 303-209.	
Wednesday, June 20	
Investment Advice—Fidelity will hold one-on-one counseling sessions. For an appointment, call (800) 642-7131.	
Thursday, June 21	
Von Kármán Lecture Series—“From Galileo to Gossamer: 400 Years of Telescope Technology” will be presented by Art Chmielewski, manager of JPL's Large Telescope Concepts Office, and Mark Dragovan, JPL research scientist, at 7 p.m. in von Kármán Auditorium. Open to the public. A live Webcast of the lecture will also be presented; for details, log on to http://www.jpl.nasa.gov/lecture/webcast/jun01w.html	
Friday, June 22	
Von Kármán Lecture Series—“From Galileo to Gossamer: 400 Years of Telescope Technology” will be presented by Art Chmielewski, manager of JPL's Large Telescope Concepts Office, and Mark Dragovan, JPL research scientist, at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.	
Monday, June 25	
Caltech Ballroom Dance Club—The first in an eight-week series of Salsa lessons will be offered from 7:30 to 9 p.m. in Dabney Lounge. The professionally taught lessons cost \$8 each or \$56 for all eight. No partner is required. Refreshments and a half-hour practice period will follow each class. For more information, contact Megan Knight at knight@its.caltech.edu .	
Merle McKenzie, Ronald Schaifer, Joseph Toczylowski, Donald Yoemans. 20 years: James Border, Margaret Borzage, Robert Brooks, Lamont Burgess, Kumar Chandra, Stephen Dawson, David Diner, Richard Doyle, Mark Gatti, Susan Gilbert-Hagood, Johanna Gunn, Charles Keith, Shankar Keni, Gail Klein, William Kleinschmidt, Jack Mallory, Jacob Matijevic, Iain McDermid, Ronald Morillo, Patrick Murphy, David Nichols, Hope Norton, Alfred Pappano, Thomas Runge, Jennifer Schlickbernd, Linda Scott, Roy Scrivner, George Shultz, Steven Wells.	
Editor's note: the May 25 issue of Universe inadvertently published a list of employees who were honored for completing 20 or more years of service during the second quarter. Only the first-quarter recipients listed above have thus far attended a luncheon reception honoring them for their years of service.	

Earth science leader praises Lab's efforts



Dr. Ghassem Asrar



In an address to JPL staff last week, Dr. Ghassem Asrar, NASA's associate administrator for the Office of Earth Science, praised the Lab for its accomplishments in Earth science during his three-year tenure and pledged an exciting future of continuing research.
Asrar told a von Karman Auditorium audience of JPL's recent successes for the agency's Earth Science Enterprise. Included were: The QuikScat satellite the Lab built with Goddard Space Flight Center; the Multi-Imaging Spectro-Radiometer (MISR) and Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instruments onboard the Terra satellite; the Active Cavity Irradiance Monitor Satellite (ACRIMSat); the Shuttle Radar Topography Mission (SRTM); and the New Millennium Program Earth Observer-1, partnered with Goddard.
JPL Earth science missions launching later this year, he noted, are Jason, a follow-on mission to TOPEX/Poseidon that will monitor global ocean circulation that launches in August; and The Gravity Recovery and Climate Experiment (GRACE), a joint U.S.- German mission to measure the components of Earth's static and dynamic gravity field, which launches in November.

Asrar said the Earth Science Enterprise has recently published a new strategic plan and research strategy for the next decade and beyond, which includes the following questions as its centerpiece:

- How is the global Earth system changing?
- What are the primary causes of change in the Earth system?
- How does the Earth system respond to natural and human-induced changes?
- What are the consequences of change in the Earth system for human civilization?
- How well can we predict future changes in the Earth system?

“We are well on our way in charting the course for Earth System Science for the next decade,” he said. “And JPL's role in this great endeavor is a crucial one.”

“JPL is also on the leading edge of geological and geophysical science,” he added, “providing us with the world's first capability to do for the solid Earth what we are now doing for climate system research.”

Complete text of Asrar's talk is available in PDF format at <http://www.jpl.nasa.gov/dailyplanet>.

A SISTER'S PASSION for EDUCATION

By Angela McGahan



Tom Wayne / JPL Photo Lab

For those who ponder the convergence of science and religion, there is Sister Clarice Lolich, a Dominican nun in the Community of the Holy Spirit, a space-science education specialist, and a retired NASA consultant.

Since 1989 Lolich has been using her time one week a month at JPL, offering the special "Sister Clarice" tours of the Lab to school children. For 11 years she has led groups of local elementary school kids on a space odyssey through the Lab. Recently Lolich announced that she is retiring from her JPL duties to be closer to her San Mateo home, and to work on a new outreach and education program idea that she has conceived at NASA Ames.

On this day, Lolich is in JPL's 167 Café, talking to a room full of fourth-graders. She is telling them all about the space shuttle and its components. She has them repeat after her that the space shuttle "takes off like a rocket, travels like a spaceship, and lands like an airplane." The children are mesmerized by her energy and her simple explanations. Next she hands out graph paper, and has the children follow simple instructions on placing X's and O's in designated squares. At the end of the experiment every fourth-grader has a picture of the orbiter, complete with external tank and booster rockets. Next stop: the Space Flight Operations Facility, where they will find out about how the Deep Space Network operates, and why it is so important.

Born in San Francisco, Lolich entered the convent of the Dominican Sisters at Mission San Jose, has two master's degrees and a doctorate in humanistic psychology. She was called "the quintessential post-Vatican II nun" by a journalist referring to the changes in the Catholic church brought about in the late 1960s, after Pope John's modernization efforts. Soon after the pope's announcement, differences of perspective developed in her community. Lolich was one of 14 Sisters who formed a new sisterly order, the Community of the Holy Spirit, in 1970.

"The new sisterly order meant that we had to find jobs," she said. "I started in the science business many years ago as a science teacher in the elementary and secondary schools with my Dominican community, and building on that experience, I became director of education for the California Museum of Science and Industry, now named California Science Center." In short order, she was organizing educational tours to Florida to see the launches of Apollo and Skylab missions. Her passion for education—particularly science and the study of space—took her all over the country as part of NASA's effort to disseminate the results of its space exploration as widely as possible. NASA provided Lolich with a van, and she drove around the country visiting various school districts, as part of the Urban Community Enrichment Program. Lolich was bringing the excitement and wonder of space exploration to inner-city schools. All the while, Lolich says that she has tried to relate the spiritual into everything she teaches, because "one of the definitions of prayer is the lifting up of mind and spirit. That is the reason for my being here."

In her lifetime of teaching science, and seeking to bring the wonder and opportunity of learning to people in various walks of life, Lolich has traveled the world and earned many awards. She

has been named Aerospace Education's Teacher Educator of the Year by

the American Society for Aerospace Education; earned the Special Recognition Award from NASA's Urban Community Enrichment Program; was given the Aviation Educator of the Year Award by the California Association of Aeronautics Educators; and received NASA's Lifetime Achievement Award from the Aerospace Education Services Program. Last but not least, the Commonwealth of Kentucky commissioned her Honorable Kentucky Colonel. She has traveled to war-torn Bosnia and helped bring some sanity to children not able to go to school, living in refugee camps. She has been to Antarctica, and is looking forward to her trip in July to Tex Mallaqia, in Puebla, Mexico, where she will teach 60 children for two weeks about planets, math, and science. She says the most important part of her teaching is "the hands-on experiences."

The breadth of Lolich's experiences indicates that she loves to try new things. For her 75th birthday she went bungee jumping, and on her 80th birthday she jumped out of an airplane. Lolich is not deterred by her age; in fact her retirement is part-time. "I intend to continue my work with NASA Ames, bringing educational outreach programs to people who cannot visit a NASA center, such as retirement-home residents, residential facilities for the handicapped, jails and homes for juvenile offenders. I will also assist in training docents at NASA Ames," she said. She emphasizes that bilingual education students need a specific outreach effort directed specifically for them. "I want people to recognize that life is full of opportunities, and that there are many options in life." Lolich does not fully discount the possibility of returning to JPL, perhaps in a limited capacity.

Back at JPL's Space Flight Operations Facility, Lolich motions to a 10-year-old boy swiveling impatiently in a squeaky chair. "Come, stand here," she says, and places him next to the giant poster of the planets. "You are the Cassini spacecraft. You are sending information you have gathered about Jupiter to the Deep Space Network on Earth." The boy motions with his hands as if handing over imaginary packages into the darkened room. Sister Clarice then picks three girls, and positions them some feet away, standing back-to-back, with elbows interlocked. "You are Spain, you are Australia, and you are California," she says, touching each girl on top of her head. "Now spin slowly, and call out your name when you pass by the spacecraft." The girls wobble along, and call out "Spain ... Australia ... California ... Spain ..." "Good," she says. She motions to another boy. "Come stand here. You are JPL, and you are receiving the information from the three satellite dishes, and making it useful for everyone to learn what the Cassini spacecraft has learned about Jupiter." The children act out their parts, and suddenly a room full of fourth-graders understands the Deep Space Network and its importance.

At the end of the tour the children shout a resounding "Thank you!" to Lolich—undoubtedly a refrain of the thousands who have visited the Lab in years past and have enjoyed the wonders of science and space exploration because of her passion and dedication.

Sister Clarice Lolich celebrated her 80th birthday by skydiving (above). At JPL, she shows a visiting student how the Deep Space Network works.

Lolich says that she has tried to relate the spiritual into everything she teaches, because "one of the definitions of prayer is the lifting up of mind and spirit. That is the reason for my being here."

Asteroids named for NEAT researchers

NEAT team members, from left: Erik Hovland, Dr. Larry Scherr, George Frascchetti, Jeff Schroeder, Tom Bickler, Dr. Matt Klimesh and Dr. Steven Pravdo, project manager.

Seven members of JPL's Near Earth Asteroid Tracking (NEAT) team have been honored for their work by having asteroids named after them.

NEAT Project Manager Dr. Steven Pravdo led a ceremony honoring:

- Jeff Schroeder, who has contributed to the mechanical design and fabrication of all the NEAT cameras, starting with the 1995 NEAT/Ground-based Electro-Optical Deep Space Surveillance (GEODSS) camera on Haleakala, Maui, Hawaii, and concluding with the 2001 NEAT/Oschin camera.



Passings

ARVOL METZINGER, 68, a retired electrician on Section 645, died of cancer May 2 at his home in Washington state.

Metzinger joined the Lab in 1950 and retired in 1989. He is survived by his wife, Ruth, nine children, four grandchildren and one great grandchild. Services were private.

HENRY ROBINSON, 84, a retired receiving and shipping clerk, died of Alzheimer's disease May 7 at his home in Glendora.

Robinson worked at JPL from 1967-83. He is survived by his wife, Alyce, son Theodore, daughter Beverly Woodcox, two grandchildren and two great grandchildren.

Services were held May 11 at Forest Lawn Memorial Park in Glendale.

JAMES MCCAUL, 66, a retired machinist, died May 26 after a brief illness.

McCaul worked at the Lab for 43 years, retiring in 1997. He is survived by his wife, Renate, and daughters Helen and Carol.

Letters

On behalf of my family and myself, I would like to thank the ERC for the lovely plant on the passing of my mother. I wish to thanki Section 331 for their support and sympathy cards and flowers for the memorial service.

Mardy Wilkins

We would like to thank the MER Project for their prayers, cards, expression of sympathies, meals, and flowers upon the death of Cece's father. Thanks also to the ERC for the beautiful plant. Your thoughtfulness was a great comfort during our time of grief.

Cece Guiar and Jeff Mellstrom

My wife and I would like to thank ERC for the lovely sympathy flower sent to our home following the passing of my 96-year-old father.

Kermit Pederson

Classifieds

For Sale

BIKE, mountain, 21 spd., Shimano equipped, 24" frame, nearly new, used little, cost \$135 new, sacrifice \$85/obo; CHAIR, black leather, high back office style, \$20; FOUNTAIN, fiberglass, mountain-look, apprx. 30" H x +34" W, w/pump, \$55. 661/297-0219.

CAMERA, 35mm SLR, Pentax Super ME, 28mm, 50mm and 200mm lenses, flashes, au-

to winder and filters, exc. cond., \$250. 626/793-7879.

CD JEWEL CASES, 50, \$10; DIET TAPES, Jeny Craig, set of 14, \$50; COMPUTER PWR. CONT. CTR., 5 pwr. switches + 1 master sw., 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; ORGAN, Yamaha 415, electronic console w/13 pedals, 3 keybds, 144 rhythm patterns, pd. \$7,500, sacrfc. for \$3,000. 790-3899.

CHINA CABINET, 1950s Drexel mahogany, e-mail lelson@altavista.com for photo, \$800, cash and carry. 353-9367.

DINING SET, table & chairs, less than a year old, great cond., Asian beechwood, mission-style, solid, dark stained wood; includes long table, 4 chairs, and one bench, \$950; REFRIG-ERATOR, good cond., white, top/bottom 2-door style, \$300. 626/432-6852.

DOG, 8-month-old girl Boxer to good home, cute, very smart, ears & tail cropped, up to

date on all shots, vg w/children, best offer. 353-9859.

DRAFTING TABLE, professional tilt-top, 38 x 72, with Vemco drafting machine, \$200. 626/395-3533.

GARAGE SALE: 50 years' accumulation; machinery, instruments, lenses, vacuum system parts, you name it; Friday, Saturday, Sunday, June 8, 9,10, 8 am.-4 p.m., 317 San Juan Way, La Canada.

GPS, Garman GPS III, moving and display, exc. cond., \$200. 626/793-7879.

LUGGAGE, pilot case on wheels, lots of compartments, great for student or professional, \$35; RING/EARRING SET, woman's 10K diamond and Ceylon blue-color lab-created sapphire, diamond and created ring, retail value \$100/\$125, sell for \$75/ea. 362-3358, Valerie.

MISC: home furnishings; stereo syst. and black lacquer TV cabinet; cardioglidge; pictures; curtains; rugs; bedding; pillows; clothes; interior door, nice, like new; baby car seats. 626/398-1988.

MOVING SALE: bedspread & 3 pillow shams, custom-made for qn. bed with rust/apricot blue flowers on linen-background fabric, \$95; vertical blinds, 104" W x 84" tall, never used (in box), white vinyl \$49; rocking chair, lightweight cherry-finish wood, \$39; small doghouse, free. 790-4719, Ann.

PRINTER, color inkjet, Compaq IJ1200, brand new, box unopened, 2400 x 1200 res., \$100, \$40 less than retail. 353-4400, Brian.

SCUBA GEAR, tank, BCD, used once, regulator, the works, woman's wet suit, all exc. cond., prices negotiable. 957-3296.

SKATES, inline, Rollerblade Lightning TRS, women's size 8, exc. cond., hardly used, \$75/obo. 952-8803, Carol.

SOFA, slip-covered, exc. cond., oatmeal color background with pale pink roses, 2 cushions, 4 pillows, \$125. 626/794-8720, Andy or Lisa.

SOFA/CHAIR SET, Frieze, exc. cond., contemporary print on black background, \$175; SEWING MACHINE, Brothers Professional, exc. cond., to make and repair boat sails, heavy sewing, \$295. 661/259-3858.

STORAGE BUILDINGS, two, 8' x 16', wood frame, siding, portable, on skids, \$995/ea. 562/699-8687.

SWIMMING POOL LADDER, stainless steel, \$15. 626/794-2431.

TABLE, candlestick, Ethan Allen, 14", \$25; FOOT STOOLS, stack, Ethan Allen, \$25. 626/797-5387.

TABLE/CHAIRS, 42", round, smoke glass, on metal base with 4 blue cloth chairs, good condition, Monrovia area, \$60. 626/357-6155.

TYPEWRITER, IBM Selectric III, exc. cond., w/cover, access. incl., \$50 firm. 626/284-9664.

WET SUIT, men's large size, jacket and Farmer John pants, Body Glove, \$20/ea; SWIM FINS, heavy duty, \$15. 626/794-2431.

Vehicles/Accessories

'86 CADILLAC Seville, exc. body, silver-gray, exc. cond., 59K mi., \$3,800. 248-4637.

'86 CHEVROLET S-10 Blazer 4 x 4, 129,000 mi., 1 owner, a/c, power windows, locks and steering, trailering hookup, roof rack, tilt steering, cruise control, runs good, everything working, good tires, \$2,800. 661/513-9079.

DASH COVER, black, for Honda Civic, '95, car cover, compact sedan \$25/ea; 2 WHEELS, '95 Honda Civic, 175 70R13, \$40. 362-3358, Valerie.

'99 FORD Explorer XLS, 4 x 4, 4 dr., vg cond., auto trans., 5 spd. w/OD, pwr. steering/doors/windows, dark blue, 33K mi., trailer hitch, 2" front/rear load leveler, 5 Goodrich all-terrain LT tires, steel wheels, a/c, am/fm/CD, roof rack, tilt wheel, cruise cont., anti-theft keyless entry, tint windows, running boards, front/side air bags, ABS, in warranty, \$23,000. 626/355-9707.

'96 FORD Explorer XLT, auto, front/rear a/c, leather, all electric, pwr. windows/doors/locks/seats, cruise cont., 6 cyl., 48K mi., alloy whls, loaded, exc. cond., \$14,500. 310/451-5919.

'94 FORD Explorer Sport, 5 spd., 4 W/D, 96K mi., black, gray leather, all power, 10-disk CD, alarm, alloy wheels, 5 new tires, \$7,000/obo. 323/655-5864.

'89 FORD Ranger XLT King Cab, w/camper shell, carpet kit, V6, 2.9L eng., a/c, pwr. steering/windows/doors, tow pkg., am/fm/cass, c.c., tilt wheel, exc. cond., 80K mi., \$4,300/obo. 626/791-7645.

'67 FORD Mustang, 390, 4 spd., S code, new paint, new interior, original LA model, 80% restored, runs great, \$9,000/obo. 626/339-9353, Greg.

'00 HONDA Civic Si, completely stock, ready to modify, blk, rear wing, LoJack, weather tech, cargo mat, 7,400 mi., mint, \$20,400. 661/255-5645.

'92 HONDA Accord EX, 2 dr., 5 spd., owned since 1993, 92 M, alarm, rose wood, air bag, moon roof, ABS, runs good, very clean in and out, \$6,250. 957-3033.

'88 HONDA Accord, blue, 4 door sedan, 5-spd.

- Thomas Bickler, who is responsible for the NEAT camera electronics, having worked extensively with CCD camera electronics systems.
- Steve LaBrecque, who was responsible for the successful installation and operations of the NEAT/Maui Space Surveillance Site camera in 2000.
- Lawrence Scherr, an optical engineer and lens designer, who designed the optics for the NEAT/Oschin instrument.
- Erik Hovland, a JPL computer programmer who developed the NEAT operations software when it changed telescopes to the Maui Space Surveillance Site 1.2m on Maui, and has helped deploy the first phase of the Keck Interferometer.
- George Frascchetti, a technical advisor and contributor to the NEAT instruments.
- Matthew Klimesh, who developed the efficient data compressor for archiving the voluminous NEAT data.

NEAT is a cooperative effort between NASA/JPL and the U.S. Air Force. It is designed to complete a comprehensive search of the sky for near-Earth asteroids and comets. The NEAT system is mounted on the Maui Space Surveillance Site 1.2-meter (4-foot) telescope.

worked fine, stuck relay after 5-yr. storage, s/b easy fix. 323/663-0769.

CATS, for adoption, several wonderful middle-aged kitties need new homes because owner recently passed away. 626/791-3763, Judy.

For Rent

ALTADENA guest house, 1 bd., Florecita area, walk to JPL, fenced yard, extra storage space, 1st month + security deposit to move in, avail. 7/1, \$475 + 1/3 utilities. 626/794-6076.

ALTADENA, beautifully refurbished 2 bd., 1 ba., 2-car garage, .5 miles from JPL, \$1,050. 323/664-5208.

ALTADENA, lg. furn. room w/cable TV, priv. ba., priv. off-st. parking, share 3 bd. 2.5 ba., quiet hilltop house, pool, lg. garden, patios, view, kitchen w. d/w, washer, central a/c, 11-min. drive to JPL, avail. by 7/1 only to smoking-tolerant, JPL empl./contr., temp. OK, \$485., in-cl. all util. 626/794-1050, after 7 p.m., Harry. LA CRESCENTA house, 3 bd., 1 ba, f/p, dining room, patio, detached garage, fully fenced yard, quiet street, good neighborhood, \$1,750. 249-9522.

PASADENA, 1 bd., .75 ba., in charming 1907 Pasadena bungalow, share house w/JPL engineer, laundry, cent. a/c, quiet neighborh'd, off-street parking, all privileges, 10 min. to JPL, prefer summer student, \$600 incl. util. 626/296-8315.

PASADENA townhouse: 2 bd., 2.5 ba., 1 mile from Caltech; stove, dishwasher, fridge, f/p, patio, a/c, 2-car garage, laundry hookups; non-smoker preferred; \$1,350 + \$1,500/sec. dep., avail. 6/15. 626/462-1497.

SOUTH PASADENA, furnished studio, 1718 Huntington Dr, betw. Marengo and Milan Ave., carport, laundry, no pets, non-smoker, available 6/21, utilities paid, \$750. 626/792-9053, Marilyn or Ray.

Real Estate

MONTROSE, 5 min./JPL, 3-level townhouse, 8 yrs. old, 1,900 sq. ft., 3 + 2.5, incl. lg. master suite, Jacz. tub, very lg. gourm. kitch. w/granite counters + breakfast nook, 2 sky lites, alarm syst., lg. 2-car attached gar., exc. view + exc. neighborh'd, new roof, \$319,000. 249-0453.

TUJUNGA, move-in cond. 2 stor'y, 3 bd., 2 full ba., large country kitch., f/p, central air, built in 1980, RV access, cute yard w/covered patio, 2-car attached garage, built-in speakers, \$228,888. 848-9977, ext. 323, agent.

Vacation Rentals

BIG BEAR, cabin, walk to village, quiet area, 2 bd., sleeps 8, completely furnished, f/p, TV/VCR, \$75 night. 249-8515.

BIG BEAR LAKEFRONT, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548.

CAMBRIA, ocean front house, sleeps up to 4, excellent view. 248-8853.

HAWAII, Maui condo, NW coast on beach w/ ocean view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, mcrow., d/w, pool, priv. lanai, slps. 4, 4/15-12/14 \$105/nt./2, 12/15-4/14 \$120/nt./2, \$10/nt. add'l person. 949/348-8047.

LAKE TAHOE, Ridge Tahoe Resort, timeshare, 2 bd., sleeps 6, 6/29-7/6/01, \$2,000. 626/282-8284.

MAMMOTH, studio condo, queen-size bed, full kitch., great complex, sauna and Jacuzzi, right across the street from a beautiful public golf course, price is rise to please. 626/791-5376.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully equip'd kitchen incl. microwave, d/w, cable TV, VCR, phone, balcony w/mtn. view, Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL discount. 626/798-9222 or 626/794-0455.

OCEANSIDE condo, fully furn. 2 bd., 2 ba., f/p, full kitchen, quiet, relaxing, in beautiful setting, located at beachside, w/BBQ, pool, spa, game room, and great ocean view, easy walk to pier and restaurants, sleeps 6, available weekly or monthly. 909/981-7492 or e-mail dfhaue@ya-hoo.com, Jim or Darlene.

OCEANSIDE, on the sand, charming 1 bd. condo; panoramic view, walk to pier or harbor; pool, spa, game rm., sleeps 4. 949/786-6548.

PACIFIC GROVE hse, 3 bd., 2 ba., f/p, cable tv/vcr, stereo/CD, well-eqpd. kit w/microw, beaut. furn, close to golf, bches, 17 mile dr, aquarium, Cannery Row, JPL discnt. 626/441-3265.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.

SAN DIEGO, Coronado Beach Resort, 1 bd., sleeps 4, July 22-29, '01, \$1,500. 626/282-8284.

SAN FRANCISCO, Nob Hill honeymoon suite, sleeps 2 max, full kitchen, maid service, concierge, reserve early, \$125/nite, \$750/wk. 626/254-1550.

Wanted

BOY SCOUT PATCHES and memorabilia, for private collection by Scout Master. 909/948-9595.

HOUSING, furn., for visiting faculty, singles, couples, families, for 10 weeks, June-Aug. Call Petra in Educational Affairs at 4-0726.

HOUSING, visiting German scientist with family, looking for furnished rental house, close to JPL, Pasadena, Monrovia, Arcadia, 7/16-8/19/01. 248-8591.

PARKING SPACES, 1 or 2, for vehicle storage of a mini RV, medium SUV size and a compact car, \$250/yr for 1, \$400/yr for 2. 1-1.5 yrs max time. 310/824-5688.

RECORDS and pre-recorded reel-to-reel tapes, '50s & '60s, by priv. collector. 626/447-3270.

ROOMMATE, n/s female preferred, 2 bd., 2 ba., apt. near Caltech in Pasadena, washer and dryer included, newly remodeled, \$650. 303/829-2920.

ROOMMATE, female preferred, to share 2-bd., 2-ba. apt. in Pasadena near 210 fwy.; separate phone line, secured bldg., pool, whirlpool, BBQ, laundry facil. in complex; \$600 + half util. (gas, electric, cable ~\$60), month-to-month lease. 626/795-8197, Denise.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present. 790-8523, Marc Rayman.

TENNIS PLAYER, for doubles, to sub occasionally on Thursdays at 5:00 in Altadena. 626/791-2464.

THEATRICAL PLAYERS, all levels of experience, for collaborative effort on digital video project. 545-8671, Dan.

VOLLEYBALL PLAYERS, coed, all levels of play, Tues. nights 8-10 p.m. at Eagle Rock High School, \$3/nt. 956-1744, Barbara.

Free

AIR CONDITIONER, Kenmore, 8000 BTU, 115V 9A, window mount, tall/narrow 15 w x 21 h,